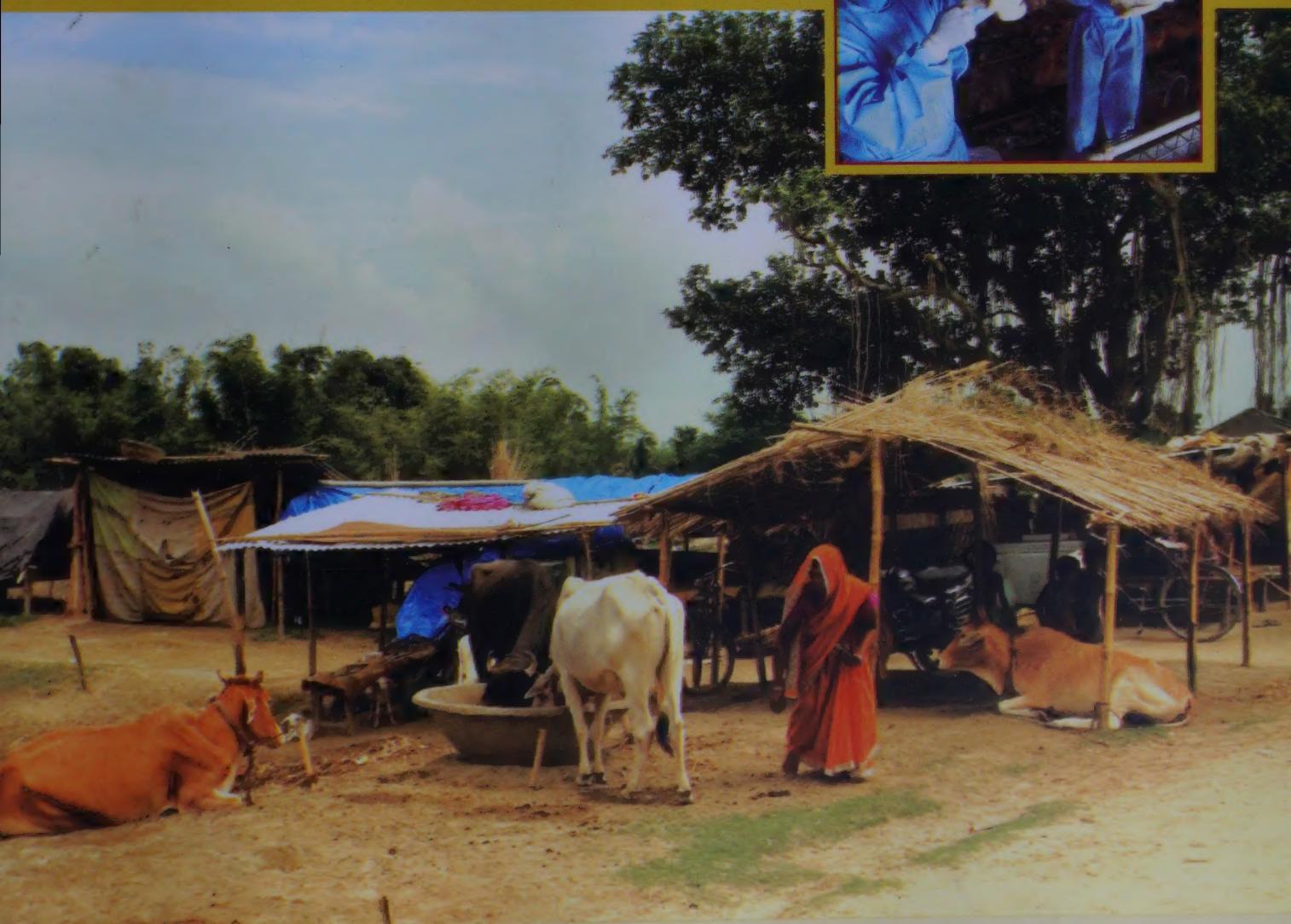


Roadmap for Combating **ZOONOSES** in India

Report of Brainstorming Meeting
New Delhi, **13 June 2008**



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Executive Summary

Zoonotic diseases are of growing national and international significance with regard to health, food safety, trade, security and economics. Prevention and control of zoonoses requires a multi-dimensional, integrated system-wide approach. Recognizing the urgency and need for stronger coordination between traditional sectors, the Public Health Foundation of India coordinated a brainstorming meeting on June 13, 2008, involving 33 representatives from 23 national and international agencies. The meeting focused on creating a roadmap for combating zoonoses in India and engaged experts from human and animal health, wildlife, vector bionomics, social and environmental sciences and research, academic and implementation agencies in the public, private and technical arenas.

The brainstorming meeting resulted in specific outcomes for a system-wide collaboration for mutual benefit and for measures that would complement and feed into existing mainstream systems. Consensus also emerged on exploring newer paradigms and approaches to combat zoonotic infections with integrated research and training programmes as the starting points. Prominent strategies identified included 'population-based' and 'commodity-based' approaches. Discussions focused on:

- key issues, driving forces, current research, and existing training programmes
- key research, training and programmatic priorities in prevention and control of zoonoses
- best practices for multi-sectoral collaboration and aligning these collaborations with national priorities and international commitments

PHFI was identified as a nodal agency to coordinate activities among all partners of the core working group and as the liaison for coordination with existing programmes and initiatives.

“Newer paradigms and approaches to combat zoonotic infections with integrated research and training programmes are being explored as the starting points”

Key outcomes and recommendations from the consultation included:

1. **Need for a collaborative initiative** to identify partners and develop mechanisms and resources for multi-sectoral collaboration and initiatives
2. **Need for advocacy and communication strategies** to raise awareness amongst various stakeholders and sections of society

3. **Research and capacity-building priorities** focused on the ‘One Health’ concept (linking all sectors ranging from human health to animal, wildlife, social and environmental sectors):

- a. **Identify and prioritize zoonotic diseases** that are amenable to multi-sectoral collaboration (based on specific criteria such as mortality rates, trade and socioeconomic issues, specific population groups).
- b. **Identify priority domains**
 - i. **Epidemiological analyses** on disease burden, standardization of data collection methodologies and data sharing, development of predictive models and analytical tools linking non-health parameters with health event predictions.
 - ii. Research on the interactions and intersection of “*host – microbes – community*”
 - iii. **Operational multi-sectoral research** focused on detection and control, shared cost-benefit studies, community-based prevention strategies, and public policy/advocacy/communications as well as models for interdisciplinary approaches that would link public health, veterinary medicine and the social and behavioral sciences.
 - iv. **Risk research** (focused on vulnerability assessment and risk mapping, identification of epidemiological ‘hotspots’ and risk factors to facilitate high priority, targeted interventions for ‘at risk’ groups and locations)
- c. **Identification of disciplines, methods and expertise** needed to address the human-animal interface for zoonoses prevention and control.

The **next steps are for PHFI to convene the core working group**, engaging all relevant partner agencies and to begin implementation of the meeting recommendations. The initial focus will be on training programmes for public health specialists that emphasize multi-sectoral experiences, and development of research programmes focused on high priority diseases that are amenable to multi-sectoral collaboration.

Acknowledgements

The Public Health Foundation of India and North Carolina Institutes are grateful to the delegates and their institutions for sparing their valuable time to attend the brainstorming consultation, participating in the deliberations and providing valuable technical inputs in developing a roadmap to combat zoonoses in India. Our special thanks to the World Health Organization, India Office, New Delhi for providing technical guidance and financial support for this activity.

List of Acronyms and Abbreviations

DALY	Disability Adjusted Life Year
ICAR	Indian Council of Agricultural Research
ICMR	Indian Council of Medical Research
ILRI	International Livestock Research Institute
IVM	Integrated Vector Management
IVRI	Indian Veterinary Research Institute
JWG	Joint Working Group
MDG	Millennium Development Goal
NC State	North Carolina State University
NICD	National Institute of Communicable Diseases
PHFI	Public Health Foundation of India
RTI	Research Triangle Institute
SEARO	Southeast Asia Regional Office of WHO
UNC	University of North Carolina
WHO	World Health Organization

Background

Zoonotic diseases threaten our health, livestock industry, the safety of our food and also have global consequences. Among new and emerging infections, 75% are of animal origin. Despite the recent wave of disease outbreaks, there is no coordinated, strategic focus on their prevention and control in many regions of the world. India is particularly vulnerable and has been challenged by zoonotic diseases such as Japanese encephalitis, Chandipura and Nipah virus, leptospirosis, and avian flu H5N1. Some of these have appeared in the last decade and have now become endemic.

Zoonotic diseases are most common in rural areas, but are found in urban areas

“Current strategies targeted towards prevention and control of zoonoses fail to recognize the ‘big picture’, and are limited by the traditional paradigms of pathogen-specific measures”

as well. India's urban population is expected to double by 2020, and the urban slum population is also expected to nearly double in this time period. The impact of these diseases is however greatest on the poorest householders who are least likely to have their family members or their animals diagnosed and treated, resulting in lost potential

and productivity. Current strategies targeted towards prevention and control of zoonoses fail to recognize the ‘big picture’, and are limited by the traditional paradigms of pathogen-specific measures. These measures often operate within the line departments of human or animal health, with the wildlife sector and its interplay with other sectors often lagging behind.

Zoonoses prevention and control programmes are a classic example of a changing and expanding set of diseases that fall too often between the cracks of the public health, environmental management, public safety, and veterinary fields. Technical capacity constraints, a lack of research-informed policy-making, and irregular surveillance and response are major challenges. However, recognition of the inter-connectedness of the various sectors has grown at the highest levels of government and health agencies giving support to this call to coordinated action. Solutions to better health and disease control demand a unified “One Health” approach linking human,

domestic animal, wildlife and environmental sectors.

“Solutions to better health and disease control demand a unified “One Health” approach linking human, domestic animal, wildlife and environmental sectors”

The Public Health Foundation of India (PHFI) plans to undertake a ‘3-5 year’ program on research, capacity building and advocacy/health promotion for prevention and control of zoonotic

“The Public Health Foundation of India (PHFI) plans to undertake a ‘3-5 year’ program on research, capacity building and advocacy/health promotion for prevention and control of zoonotic infections in India”

and outputs of the program will feed into the mainstream disease surveillance systems across sectors.

infections in India. This collaborative program brings together a set of national and international organizations with proven research and capacity-building capabilities in the prevention and control of emerging infectious diseases.

The proposed program takes a system-wide collaborative approach for the mutual benefit of all sectors (human, veterinary and wildlife). Outcomes

Meeting Proceedings

As the precursor to the above program, a brainstorming consultation of key stakeholders was organized on 13th June 2008 in New Delhi. The meeting was attended by 33 representatives from 23 national and international agencies, research institutes, implementation agencies, public, private and technical bodies. The disciplines represented included human health, veterinary health, wildlife, vector bionomics, social sciences and environmental sciences. The consultation was organized with the following objectives:

1. To discuss key issues, driving forces, current research, and existing training programmes
2. To identify key research, training and programmatic priorities in prevention and control of zoonoses
3. To develop and strengthen multi-sectoral collaborations aligned to national priorities and international commitments using a best practices approach

Introductory session

The proceedings began with an introductory presentation by PHFI that maintained a focus on the themes and challenges in zoonoses.

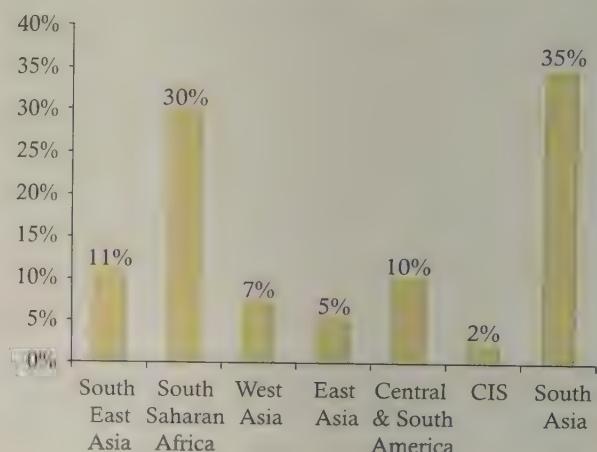
The presentation, *Roadmap to Combat Zoonoses – Changing Paradigms*, provided an overview of the need to address zoonotic diseases which includes

“The presentation provided an overview of the need to address zoonotic diseases which includes their dual burden on animal and human health, a propensity to be underdiagnosed and underreported”

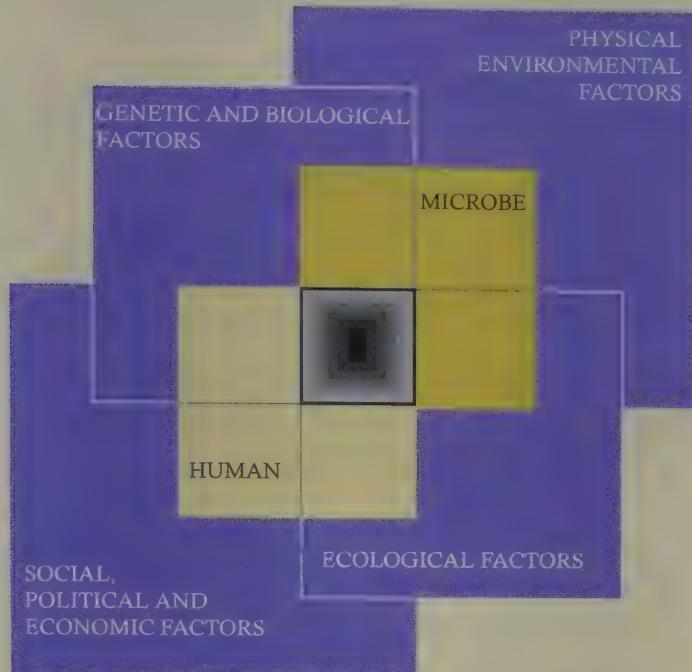
Figures 1a and 1b: Risks and burden of zoonoses on livestock keepers



Source: WHO, 2002



Source: Thornton et al. 2002

Figure 2: Institute of Medicine Convergence Model

Source: NAP, 2003

their dual burden on animal and human health, a propensity to be underdiagnosed and underreported, pathogen spill-over to and from wildlife, associations with climate change, potential for biowarfare, and disproportionate burden on the health and economic well-being of the poor.

Zoonotic diseases tend to affect families in poor and marginalized communities as livestock contribute to livelihoods of at least 70% of the world's rural poor (Figure 1a, 1b). Furthermore, major **changes in global food consumption patterns** with a shift from a resource (feed availability)-driven system to a demand-driven system (livestock revolution) have greatly increased human-animal contact.

The **Institute of Medicine's convergence model** (Figure 2) for zoonotic disease was discussed. The core of the convergence model is the contact between humans and pathogens and supporting risks on and across each interface. The model includes risk factors for the emergence of zoonotic diseases – ecological, physical, environmental, genetic, biological, social, political, and economic changes. Also discussed were known risk factors for increased disease occurrence (ecological disruption, social, political factors), suspected risk factors (environment, genetics), and unknown risk

“Due to the complex interplay of risk factors it is thought to be virtually impossible to predict the nature of the next outbreak or its precise location”

factors which are by nature a closed book. Due to this complex interplay risk factors it is thought to be **virtually impossible to predict the nature of the next outbreak or its precise location** (WHO, 2006).

The **current approaches to zoonotic disease prevention and control** however, do not account for many of these influences in a coordinated manner and instead **represent divided constituencies**. Most initiatives for research, capacity building, and surveillance are agent-and sector-specific with competing interests and priorities. Furthermore, many “**in between agents**” are not clearly identified with either animal or public health sectors, e.g. new influenza viruses; *Salmonella enteriditis*; *Listeria monocytogenes*. Additional challenges include **poor integration of wildlife sector and disproportionate public attention on remote “eco-niches”** while threats such as avian influenza in West Bengal are closer to home.

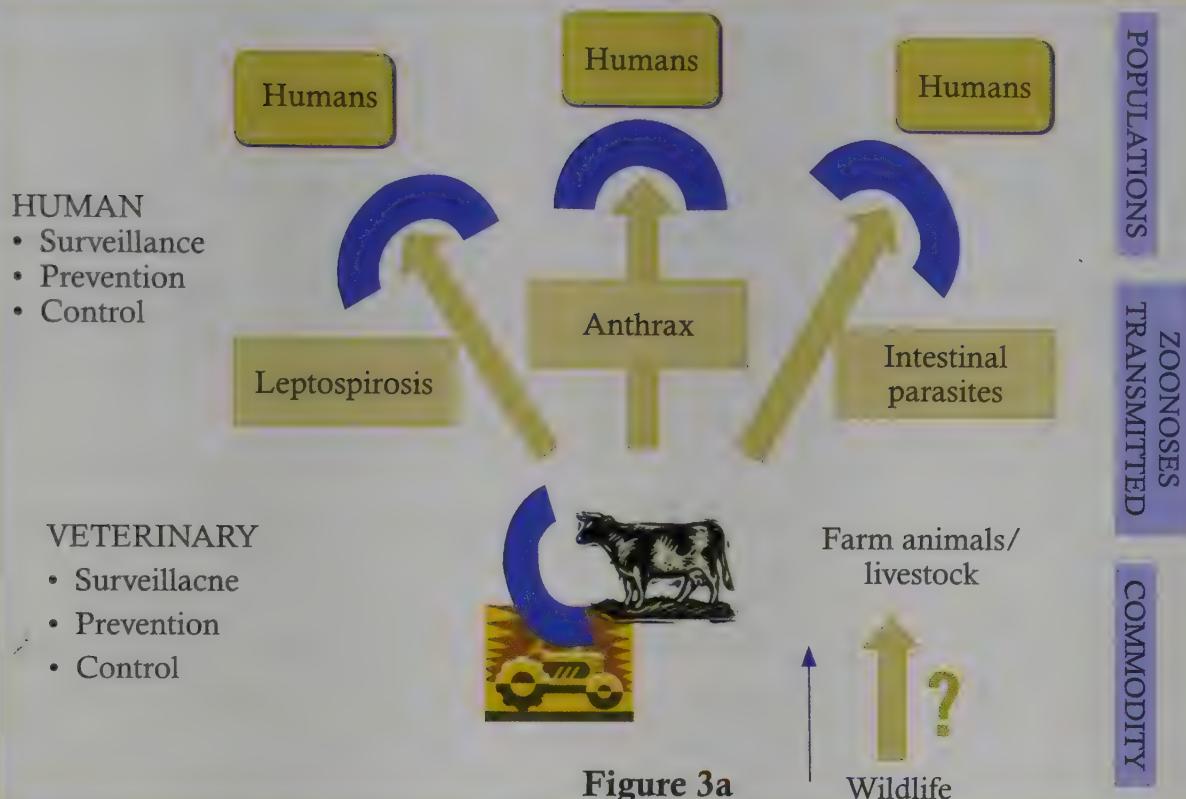
New paradigms with multi-sectoral collaboration are evolving in response to the deficits of contemporary zoonotic disease control programmes. A “**one health” integrated approach with coordinated public and animal health action on an equal partner basis** is such a paradigm. These paradigms broadly seek a **shift from organism and sector focus to “population” and “commodity” focus** and a **shift from disease reduction to risk reduction**. Diseases tend to be in clusters in certain locations and high risk groups and more diseases can be targeted using the same **interventions to achieve higher economies of scale**. Figures 3a & 3b highlight a disease-specific focus versus a comprehensive, resource-optimizing approach.

“**New paradigms with multi-sectoral collaboration are evolving in response to the deficits of contemporary zoonotic disease control programmes. A “one health” integrated approach with coordinated public and animal health action on an equal partner basis is such a paradigm**”

A ‘**separable cost**’ approach for sector-wise spending enables cost sharing which maximizes benefits to all sectors. The non-monetary benefits are DALYs averted and monetary benefits include improved productivity, reduced expenditure on animal and human treatment, and the prevention of income loss for patients and caretakers (Figure 4). Integrated zoonoses control can make significant contribution towards meeting the Millennium Development Goals (MDGs) in poor and marginalized live stock-keeping communities

Two examples of integrated control from other regions were highlighted. In the first example, Mongolia sought to transform the dual burden of brucellosis, which had 16 percent prevalence in herdsmen and other animal workers, into dual benefit (Zinsstag J et al 2005). Using a “**separable costs**” approach, if monetary costs of

Prevention and Control of Zoonoses: TRADITIONAL PARADIGM



Prevention and Control of Zoonoses: INTEGRATED PARADIGM

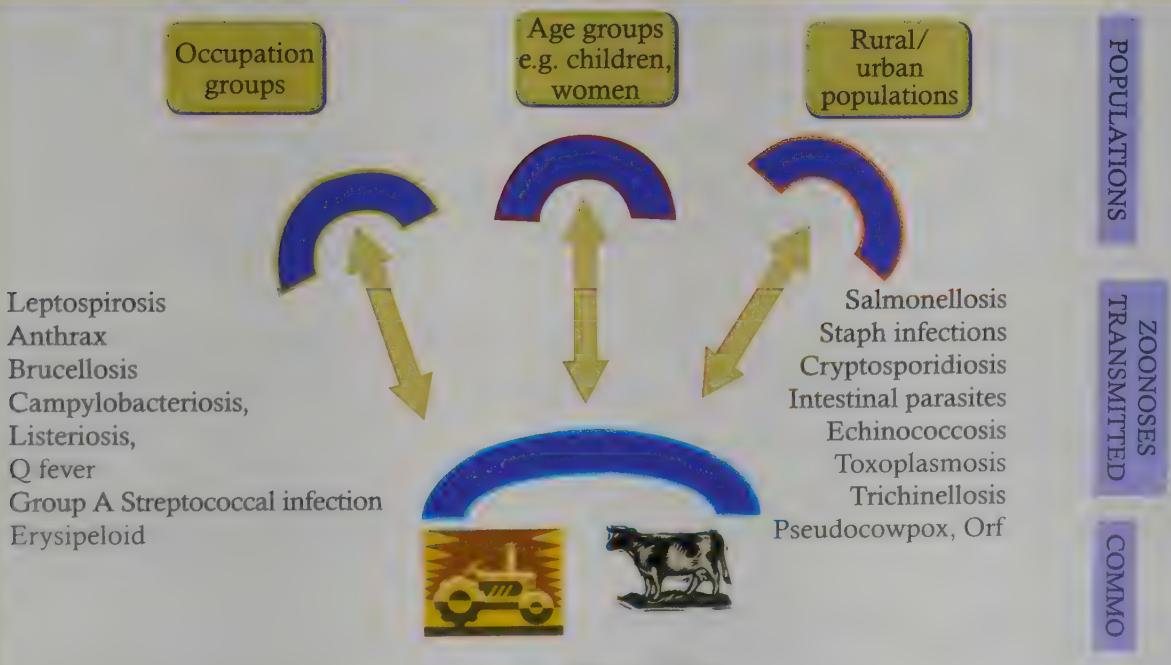
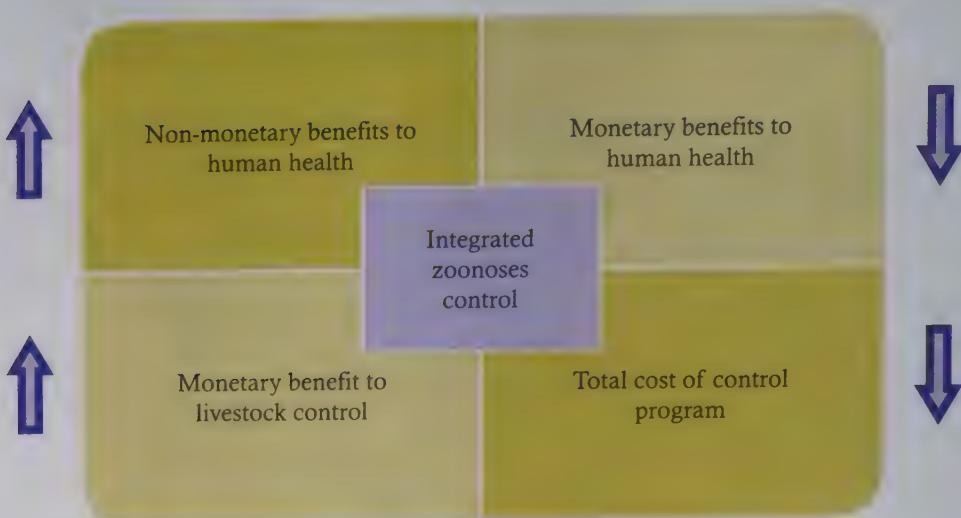


Figure 4: Financial benefits of integrated control



Source: WHO, 2006

“Integrated zoonoses control can make significant contribution towards meeting the Millennium Development Goals (MDGs) in poor and marginalized live stock-keeping communities”

for control of human and animal African trypanosomiasis (HAT) (*Unpublished data: Alexandra Shaw & Paul Coleman; Odiit M et al., 2005*). Using PCR technique, 18 percent of cattle were found to be infected for HAT compared to 1 percent as detected by microscopy. This cattle infection is largely asymptomatic and outlives vector control. Thus, block treatment of cattle stopped transmission to people with additional benefit to livestock.

In addition to integrated approaches for control, **such efforts can be applied to research for generating evidence**. Examples of key areas for research integration and specific topics under each area were mentioned.

Finally, an **integrated approach to training and capacity-building** is also required. Training could be **short term or curricular, competency-based**

brucellosis were shared between health and veterinary sectors proportionate to monetary benefits, controlling brucellosis would be profitable for both sectors. The cost per DALY averted in the human health sector would be only US\$ 19 which falls within the WHO band of highly cost-effective interventions, costing US\$ 25 or less per DALY averted. In the second example, in Uganda, modern laboratory tools were deployed

“Zoonosis is a multi-dimensional public health problem with impact beyond morbidity and mortality. Prevention and control needs an integrated system-wide approach that is more complete and efficient compared to compartmentalized models”

(within and outside of sector competencies), **solution-based** (social, ecological, microbiological and epidemiological factors), incorporate collaborative research topics and target both **professionals and para-professionals**. **Cross trainings** could occur across institutions and sectors using training packages developed within and outside of these institutions and sectors.

In summary, zoonosis is a multi-dimensional public health problem with impact beyond morbidity and mortality. **Prevention and control needs an integrated system-wide approach that is more complete and efficient compared to compartmentalized models.** Newer paradigms have the potential to break multi-sectoral barriers and motivate collaboration. Collaborative multi-sectoral research and capacity building have demonstrable comparative advantages.

The discussion covered a range of topics. Concerns regarding an integrated strategy were raised in that integration at intervention and sectoral levels should be substantive and not in name only. Social sciences and the need for community involvement, concern for livelihoods, and strong communication methods were stressed. Difficulties encountered in avian influenza control in West Bengal where community members would actively subvert the work of culling teams were cited as examples. The experience of a veterinary public health program in another region which united countries on the basis of trade was shared and that the economic and industry aspects of zoonotic diseases are powerful motivators to create political interest and will towards an integrated strategy for prevention and control. The implementation and translation of interventions was highlighted as a key bottleneck. All participants concurred that while there were numerous challenges, a start had to be made somewhere.

Breakout sessions

Session 1: Research Priorities

The first breakout session dealt with research priorities for integrated multi-sectoral collaboration. The session was conducted in three separate groups.

Three scenarios were simulated in the breakout sessions in which an integrated, multi-sectoral roadmap for prevention and control is needed, as vertical approaches have previously been only partly successful.

Scenario 1: Rural zoonoses – more than 70% of the Indian population lives in rural areas and is engaged in agricultural work that exposes them to the risk of zoonotic infections.

Scenario 2: Urban zoonoses – more than 1/3 of Indians are living in high-density urban areas and are exposed to a variety of zoonotic infections.

Scenario 3: Pediatric zoonoses – currently, more than half of Indian children are malnourished and living in poverty, and are living in environments that expose them to a variety of zoonotic infections.

For each of the scenarios, the following points were provided for discussions:

1. Identification of diseases where there are opportunities for multi-sectoral collaboration in these populations and geographic areas
2. Priority research issues and questions for prevention and control in these populations
3. Disciplines, methods, and expertise needed to address the human-animal interface for prevention and control
4. Participants and mechanisms for multi-sectoral work and collaboration
5. Strategies for overcoming challenges or constraints to intersectoral collaboration
6. Resources

Session 2: Training and Capacity Building Priorities

Breakout Session 2 addressed training and capacity-building priorities for integrated multi-sectoral collaboration. The same scenario and groups from Breakout Session 1 were used.

The following points for discussions were provided for each of the scenarios:

Training and capacity-building

- a. Gaps/needs and issues: inter-sectoral mechanisms, competency/evidence/case-based
- b. Training topics
- c. Target audiences/people
- d. Methods and strategies
- e. International collaborations
- f. Resources

“Three scenarios - rural zoonoses, urban zoonoses and pediatric zoonoses were simulated in the breakout sessions in which an integrated, multi-sectoral roadmap for prevention and control is needed, as vertical approaches have previously been only partly successful”

Summary of key recommendations

1. Need for a collaborative initiative

Zoonoses control activities need to cover humans and animals and accordingly benefit human health, veterinary and wildlife sectors. While there are challenges of non-convergence and competing priorities amongst sectors, there is common ground that can facilitate multi-sectoral collaboration. A growing body of evidence and experiences from other parts of the world clearly demonstrate feasibility, relative advantage and benefits of collaborative approaches for mutual benefit. Encouraging cost-sharing in proportion to the benefits gained by each sector could be a strong enabling component of a “**one health**” approach.

“An approach especially targeted towards ‘population’ groups and ‘commodities’, though less specific, can have major benefits when used as preventive measures”

Existing approaches to zoonotic disease control and research continue to benefit from current vertical and/or compartmentalized approaches. This is essential to make control efforts more specific and inform preventive measures. However, a **joint approach especially targeted towards ‘population’ groups and ‘commodities’**, though less specific, can have major benefits when used as preventive measures.

Accordingly, the group strongly recommended the need and timeliness of an initiative such as this one, offering as it does a ‘Roadmap for combating zoonoses in India’.

2. Advocacy and information – recognition of relevance

To ensure that importance of zoonotic diseases is recognized by decision-makers, donors and the general population, effective advocacy and health promotion firmly grounded in evidence-based assessments is needed. The group strongly recommended the need for a systematic and comprehensive advocacy and communication strategy to **raise awareness amongst various stakeholders and sections of society**.

3. Research and capacity building priorities

The group strongly recommended that the joint approach of “**one health**” be extended to research and capacity building initiatives. Collaboration around domains of mutual benefit have demonstrable comparative advantage of greater efficiency and complementarity, potential to break multi-sectoral barriers and motivate collaboration around control programmes.

A. Research priorities:

a. Priority zoonoses amenable to multi-sectoral collaboration:

The following criteria were recommended while prioritizing zoonotic infections based on available evidence:

- Disease(s) contributing to significant mortality and/or morbidity,
- Disease(s) known to interfere with international travel or trade,
- Disease(s) disproportionately affecting socio-economically deprived populations much more, thus contributing to equity gap,
- Disease(s) with unusual and new presentation, unusual for season or areas and/or unusual fatality,
- Disease(s) **peculiar to particular populations groups and/or locations** with a tendency to cluster with other diseases and therefore amenable to simple interventions impacting more than one disease

The following diseases, which also fall into one or more of the above criteria, were recommended by the group as **priority zoonoses to be targeted** for prevention and control:

- Leptospirosis
- Rabies
- Japanese encephalitis
- Anthrax
- Brucellosis
- Bovine tuberculosis
- Cysticercosis
- Rickettsial infections
- Salmonellosis

The group felt that while avian influenza was important, programmes to deal with it are rather well-funded with concerted efforts targeted globally. However, the disease can be a starting point for identifying common ground and fostering collaboration across sectors.

b. Priority domains for collaborative research:

Epidemiological research:

- **Disease burden** studies including investigation of methods for quantifying rate of under-reporting of zoonoses in humans

- Disease **data standardization** and mechanisms/methods for data sharing and linkages
- **Predictive epidemiological models** and analytical tools; **linking non-health sector data** for health event prediction

Host – microbe – community interactions research:

- Population-based studies to **understand disease ecology and its determinants: biological factors; microbial ecology; vector bionomics; environmental/climatic factors; social factors; sustainable development**

Detection and control:

- **Prevention, diagnosis and morbidity management** of zoonoses
- **Operational research** on:
 - ❖ Surveillance models such as **collaborative surveillance, community-based surveillance, cross-border surveillance**
 - ❖ **Strengthening diagnostic capacity across sectors** through sharing of existing resources and tools and development of newer methodology, tools and algorithms
 - ❖ **“Control packages”** of a group of human and animal diseases with health promotion as the central theme; targeted towards population and commodities and backed by assessment of their impact, safety and cost-effectiveness
- **Shared cost benefit studies:**
 - ❖ Assessment of DALY burden in humans and cost of disease in animal sector
- **Community-based prevention strategies** including financing mechanisms to support community-based actions for prevention and control of emerging zoonoses
- **Public policy/advocacy/communications, and models of interdisciplinary approach** – linking public health, veterinary medicine, and the social and behavioral sciences.

Risk research:

- Linking risk to detection activities and preparedness:
 - ❖ **Vulnerability assessment and risk mapping** of zoonoses
 - ❖ Identification of epidemiological ‘hotspots’ for cross-border spread

- ❖ Assessment of risk factors in both humans and animals with a view to successfully targeting **at-risk groups and locations for high priority interventions**
- c. **Disciplines, methods, and expertise needed to address the human-animal interface for prevention and control**

Zoonoses are a multi-dimensional public health problem with impact beyond morbidity and mortality. Prevention and control of zoonotic infections thus needs an integrated system-wide approach. While human health, animal health and wildlife health are core disciplines to address the human-animal interface, **the complexity of the interaction is demonstrated by the variety of disciplines recommended by the group** that need to be engaged for effective prevention and control. These include:

- Public health: epidemiologists, laboratory medicine specialists, clinical medicine specialists, municipal health experts, social scientists, nutritionists
- Animal health: epidemiologists, laboratory medicine specialists, clinical medicine specialists, food safety and processing experts, nutritionists
- Wildlife functionaries and experts
- Entomologists
- Agriculture scientists
- Environmental scientists, public health engineers, urban planning experts
- Communication specialists
- Legal experts
- Private sector

d. Participants and mechanisms for multi-sectoral work and collaboration:

While the group recognized that overall challenge to effective prevention and control of zoonoses is compartmentalization and lack of coordination between sectors and stakeholders, especially at the ground level, some of the determinants of this lack of coordination identified included:

- Lack of manpower and trained experts in rural settings
- Weak diagnostic services
- Under-reporting
- Lack of information sharing
- Lack of guidelines for lines of responsibility
- Lack of forums for interaction

- Cross border challenges
- Resource constraints
- Lack of political and administrative commitments.

The group thus emphasized the **need for an initiative that can coordinate and collate the efforts of various sectors including the private sector and civil society organizations** thereby facilitating a pool of resources (rather than duplication), making interventions more effective and achieving mutual benefits. **PHFI was unanimously identified as a nodal agency** for such an initiative. Objectives, guiding principles, strategies and structure for the initiative were recommended by the expert group (Box 1) (Figures 5a and b)



CPHE

Roadmap to Combat Zoonotic Infections in India – a Multi-sectoral, ‘One Health’, Transformative Global Model

Objectives:

- Facilitate linkages and information sharing between the veterinary, wildlife and public health sectors
- Undertake collaborative research on zoonotic diseases including emerging zoonoses to best inform public health policy for mutual benefit
- Develop health workforce capacity across sectors for surveillance and response to zoonotic infections including emerging zoonoses

Guiding principles:

- Multi-sectoral and inter-disciplinary “**one health**” approach to surveillance, response, research, capacity building and advocacy/communication to combat zoonoses for common benefit
- In the context of emerging zoonoses, shifting focus of public health strategy from response and containment to preparedness and mitigation by adopting a risk-based approach
- A strategy that complements existing mechanisms and is aligned with national health priorities and international commitments

Key strategies:

- 1. Surveillance and coordination:** through provision of a platform of key stakeholders for regular exchange of knowledge, information, evidence to guide research and capacity building efforts
- 2. Research for improved policy:** through a three-pronged approach of core research, operational research and translational research; research priorities will focus on understanding the geographic, economic, biological, environmental, climatic, social factors involved in disease dynamics
- 3. Capacity building:** through an integrated approach to competency-based human resource development; innovative need-based and client-based trainings for various categories of workers in the veterinary, wildlife and health sectors with a focus on problem solving

Partnerships:

- A three-tier system of partnership for effective coordination: 4 primary partners viz. PHFI, State University of North Carolina, University of North Carolina and RTI International. Primary partners will also work for financial sustainability and advocacy
- PHFI as nodal agency for the initiative at the national level and a multi-sectoral Joint Working Group (JWG) to be constituted with PHFI as the Secretariat
- Joint Working Group (JWG) to comprise of key technical stakeholders: assist and partner in implementing the activities under the program; ensure sustainability, ownership and potential scaling up of the outcomes of the initiative
- Technical Advisory Group (TAG) on Zoonoses prevention and control to be constituted as national surveillance coordination mechanism; to comprise of important stakeholders and national and international experts; to meet regularly and
 - ❖ review the latest scientific developments,
 - ❖ provide expert consultation and advice to national health programmes and responses
 - ❖ recommend context and need-specific guidelines
 - ❖ identify and facilitate fostering national and international partnerships
- Project partners from various sectors, including national and state governments to be identified and a network of networks to be developed: smaller multi-sectoral networks around collaborative research projects and capacity building activities; technical agencies to take lead on these projects with PHFI as the technical partner and coordinating agency in all or most of these projects.

Roadmap to Combat Zoonotic Infections in India

Objectives, guiding principles and strategies

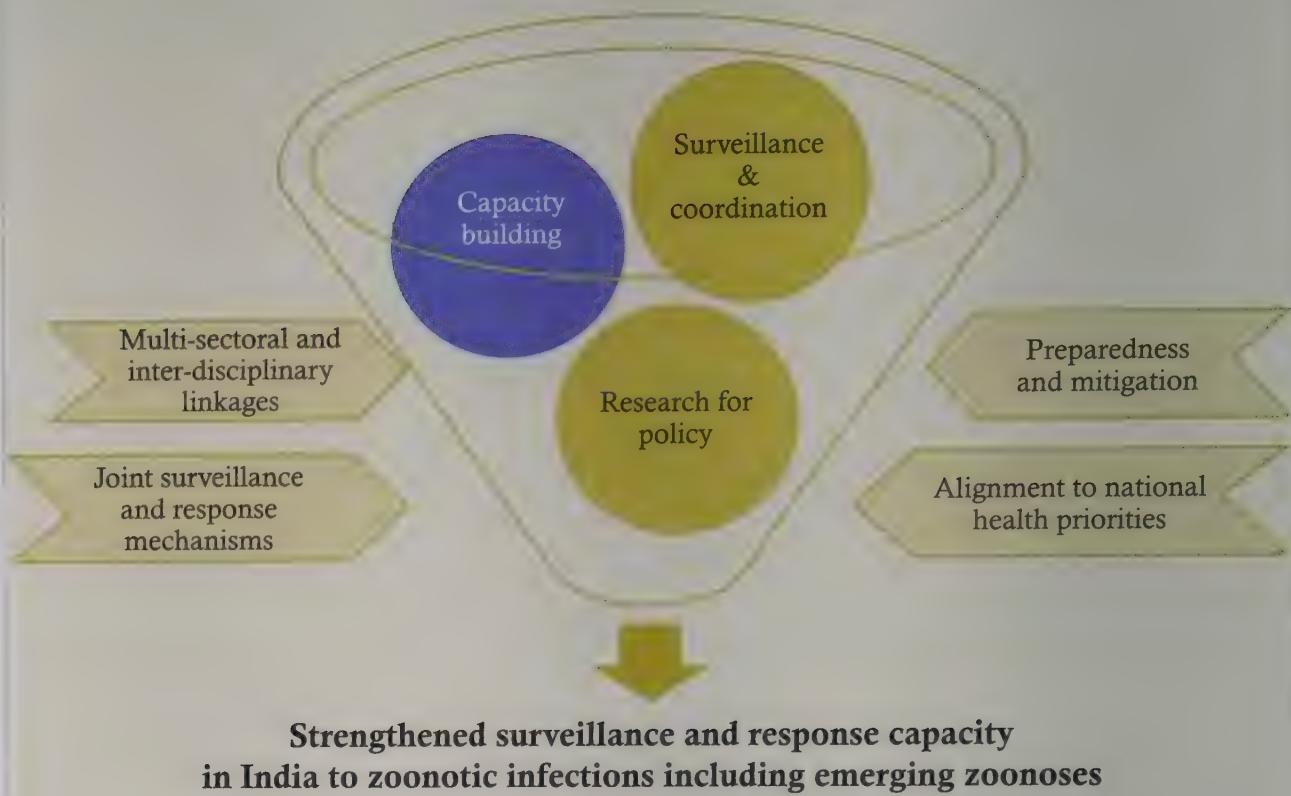


Figure 5 a:

Partnership Mechanism for the Proposed 'Roadmap for Combating Zoonotic Infections in India'

Primary partners
(Funding, coordination, implementation, M&E)

PHFI-State University of North Carolina-
University of North Carolina-
RTI International

Technical partners
(Technical consultation, implementation, M&E)

NICD-ICMR-ICAR-Min of Environment & Forests- WHO-ILRI

Project partners
(Implementation)

Human, animal and wildlife institutions and universities, IDSP, state governments

Figure 5 b:

Capacity-building

The group identified constraints around human resource capacity as a major hurdle to effective surveillance and response. It is imperative to conduct a needs assessment to understand the gaps, weaknesses, opportunities, and threats across sectors and levels of functionaries in order to guide incremental needs for building adequate surveillance and response capacity. Other recommendations made by the group to address gaps in human resource capacity include the following:

a. Training topics

Content could be drawn from existing veterinary and medical education curricula and topics of broad interest that incorporate maintaining interdisciplinary approach to zoonotic infections. Topics should cover **epidemiological, microbiological, ecological, environmental and socio-economic determinants of zoonoses**.

Soft skills like management, communication, team-building and leadership may be imparted as essential components of training curricula of integrated trainings.

b. Target audiences

Target groups could be drawn from **newer professionals as well as in-service professionals for continuing professional education** across sectors.

A wide range of groups at the **national as well as sub-national levels** need to be targeted:

- ❖ public health, epidemiologists, researchers, program implementers, veterinarians, physicians, laboratory specialists, policy makers
- ❖ professionals and para-professionals

c. Methods and strategies

- Training and capacity-building with **integrated approach that is need-based and client-based is required.**
- Within this integrated approach to training and capacity-building, focus should shift from **knowledge-based education to competency-based human resource development**; trainings should focus on learning through shared experiences and building problem solving skills through use of methodologies like scenario-based learning, case studies, simulations, mock drills, table top exercises in class room as well as field setting.

“Within the integrated approach to training and capacity-building, focus should shift from knowledge-based education to competency-based human resource development”

- **Training packages** for incremental learning/competencies can be developed for target groups of other sectors in the host institution/sector. Cross trainings could then be organized across institutions and sectors using these packages.
- Short training could be imparted as stand-alone modules and also feed into the other existing and evolving curricula as a short term strategy. **Integrated interdisciplinary approach could also be extended to formal curricula like MVPH, MPH and, PhD to promote collaborative research.** In medium to long term, suitable revisions could also be suggested in medical and veterinary medicine curricula for inclusion of zoonoses as an interdisciplinary subject.
- **Post-training technical support, mentoring and handholding** should be an integral component of trainings to ensure an appreciable impact of the program on surveillance and response capabilities of various sectors.
- **Distance learning/re-education/update modules** and electronic evaluation/ self assessment tools can further help overcome operational barriers.
- **Quality assurance tools** for process, outcome and impact assessment of training programmes to be developed.
- Trainings could be offered using a **cascade mechanism of institutional capacity** building of master training institutes across the country.
- **Suitable motivation/incentives** should be identified for good trainers thereby fostering innovation in education.

d. International collaborations

The role of a central body was recognized and **PHFI was identified as the nodal agency** to spearhead the development and implementation of an integrated training strategy in collaboration with partner agencies, both national and international. This would involve sharing of teaching material, students and experts.

Next steps and the way forward

Translation of deliberations during this consultation into immediate and longer term action was discussed and the following recommendations were made:

Short term (0-1 year):

- ❖ Formation of a **Joint Working group and Technical Advisory Group** coordinated by PHFI

“The need for a central body was recognized and PHFI was identified as the nodal agency to spearhead the development and implementation of an integrated training strategy in collaboration with partner agencies, both national and international”

- ❖ Create small **core groups** to detail research, capacity building and health advocacy and promotion priorities including specific projects/ activities, location and partners; collate these to develop a focused **plan of action for next 3-5 years**
- ❖ Apply for **funding grants for research and training**
- ❖ **Initiate projects on research and training** with support of existing donor support
- ❖ Facilitate coordination and information exchange through initiation of a **list serve and hosting of web portal on the PHFI website**

Medium to long term actions are (2-5 years):

- ❖ Plan and organize **bi-annual conferences with national and international participation** to promote the concept of “**one health**” and collaboration between sectors
- ❖ Launch an **electronic Indian journal on emerging infectious disease**
- ❖ **Identify/engage other partners**

Project evaluation

Long term impact can be assessed by the following:

- ❖ Funding grants mobilized successfully
- ❖ Number of collaboration and networks operationalized
- ❖ Number of collaborative research projects undertaken and the findings published
- ❖ Number of collaborative training programmes developed and implemented

Expected long term outcome:

- ❖ Strengthened inter-sectoral surveillance and response capacity in India to emerging zoonotic infections

It was expressed by several members that advocacy should follow soon as well. A strategic and planned approach was suggested to consolidate core competencies, and outline the need for investment in zoonotic control. Several related areas have money available to support and it should be used to create the various networks discussed during the meeting. SEARO is soon publishing a regional document on research priorities which will support this work, and the IOM report has opened the doors for much external funding which should be investigated.

References

Institute of Medicine.(2002). *The Emergence of Zoonotic Diseases: Understanding the Impact on Animal and Human Health*. Meeting Summary. Washington DC

National Academy Press.(2003). *Microbial threats to health: emergence, detection and response*. Committee on Emerging Microbial Threats to Health in the 21st Century. Meeting Summary. Washington DC

World Health Organization. (2006). *The control of neglected zoonotic diseases*. Meeting Report. Geneva

Schelling E et al. Synergy between public health and veterinary services to deliver human and animal health interventions in rural low income settings. *BMJ* 2005; 331: 1264-1267

Zinsstag J., Roth, F., Orkhon, D., Chimed-Ochir, G., Nansalmaa, M., Kolar, J., Vounatsou, P. (2005). *A model of animal-human brucellosis transmission in Mongolia*. *Preventive Veterinary Medicine*; 69:77-95.

Odiit, M., Coleman, P.G., Liu, W.-C., McDermott, J., Fèvre, E.M., Welburn, S.C., Woolhouse, .E.J. (2005). *Quantifying the level of under-detection of Trypanosoma brucei rhodesiense sleeping sickness cases*. *Tropical Medicine and International Health* 10:840-849.

Agenda

9:00–9:30	Registration
9:30–10:30	Introductory Remarks <i>Dr SK Satpathy (Director Training PHFI), Dr Sampath K Krishnan (Coordinator CDS, WHO India), Dr SP Singh (Chair IAVPHS & Head VPH, GB Pant University), Dr A C Mishra (Director, NIV) North Carolina Team (Peggy Bentley, Prema Arasu, Scott Wetterhall)</i>
10:30–11:15	Themes & Challenges <i>Dr Manish Kakkar (PHFI)</i> <ul style="list-style-type: none">• Roadmap to combat zoonoses: changing paradigms• Questions and answers• Framework and goals of the meeting and break-out sessions
11:15–11:30	Tea Break
11:30–13:00	Break-out Session #1 Research priorities for integrated multi-sectoral collaboration: <i>Questions, domains, methods, mechanisms of collaboration, resources</i>
13:00–14:00	Lunch
13:00–14:00	Reports from Break-out Session #1: Research priorities <i>Chairs: Dr S K Satpathy, Dr Scott Wetterhall</i>
14:45–15:45	Break-out Session #2 Training and capacity building priorities for integrated multi-sectoral collaboration: <i>Competencies, approaches, needs, cross training and mechanism for integration, resources</i>
15:45–16:00	Tea Break
16:00–16:45	Reports from Break-out Session #2: Training and capacity building priorities <i>Chairs: Dr A C Mishra (Director, NIV Pune), Dr Peggy Bentley</i>
16:45–17:30	Next Steps Moderators: <i>Dr SK Satpathy, Dr Prema Arasu (Asstt Dean International & Assoc Prof State University of North Carolina</i> Priority actions for multi-sectoral collaborations Closing remarks

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